

Pacific Southwest Research Station

Sierra Nevada Research Center

Fire and Fuels Management, Landscape Dynamics, and Fish and Wildlife Resources: Study Design for Integrated Research in the Northern Sierra Nevada

The Research:

The SNFPA Decision (both 2001 and 2004) specifically called for a study related to the HFQLG Pilot Project to examine the effects of management-induced changes in vegetation on California spotted owls, their prey base, and their habitat. Some response variables require study over large geographic domains, e.g. what many refer to as the landscape level, while other response variables are appropriately examined using smaller geographic domains, which will enable use of more standard experimental designs.

Objectives:

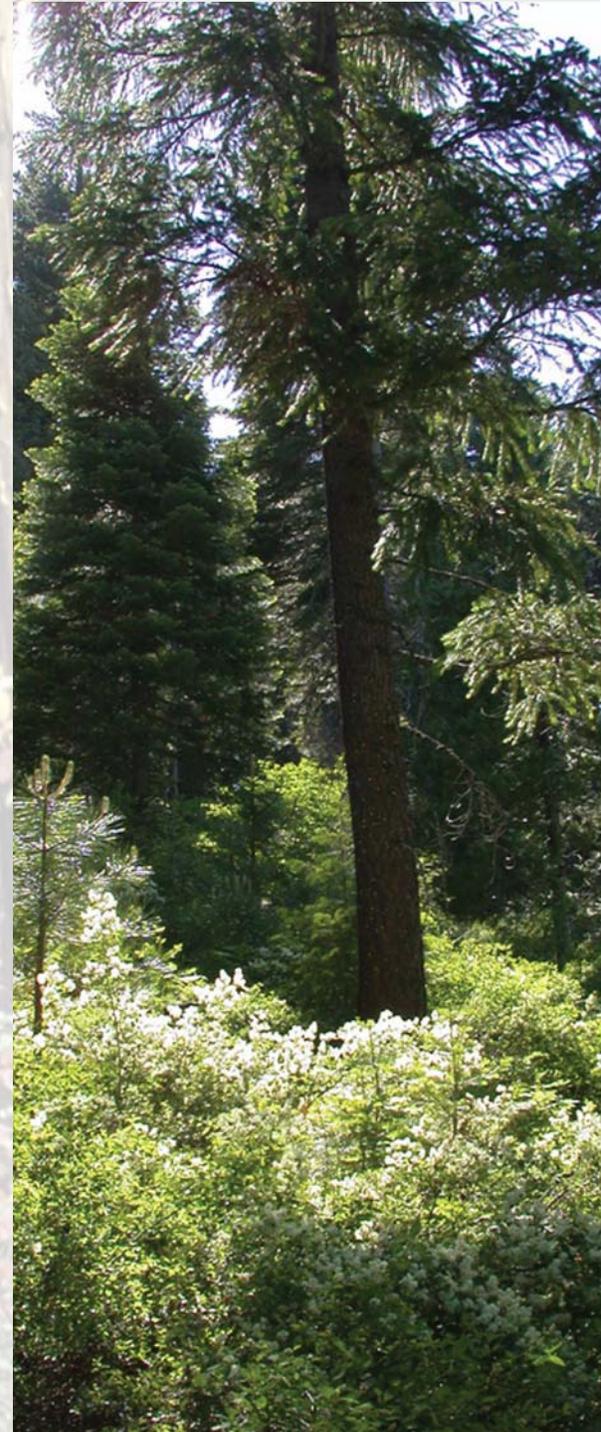
The main objectives of the integrated research program include:

Wildland Fire Behavior and Protection. How do silvicultural treatments change existing conditions of fuels and thus affect potential fire behavior and effects? Are specific combinations of defensible fuel profile zones (DFPZs) and subsequent area fuel treatments effective in reducing the extent and severity of wildland fires? Are realized fire management benefits consistent with hypothesized results in reducing fire risk and altering fire behavior?

Landscape Dynamics. How do combinations of DFPZs, area fuel treatments, group selection, riparian protection standards, and species-specific protection measures affect landscape dynamics such as forest structure, composition, and succession at multiple scales of space and time?

Species Viability. How will old-forest-dependent species, particularly the California spotted owl and its prey base comprised of various species of small mammals, respond to changes in vegetation composition, structure, and distribution induced by the planned forest management regime? How is response to treatments manifested at the individual and population levels of biological organization?

The above three issues are inextricably linked to a dynamic forest ecosystem that is subject to natural processes of growth and mortality as well as vegetation manipulation through management and uncontrollable forces of weather and climate. All components of a forest respond to the dynamic nature of a forest ecosystem through continual adaptation across the landscape over space and time.



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Our Mission:

Sierra Nevada Ecosystems are complex and our knowledge of them is incomplete. As a result, the long term outcome of any given land and resource management strategy is uncertain. We will provide assistance to land managers and policy makers by addressing this management dilemma through targeted research, emphasizing an integrated, ecoregional approach to examine particular physical, ecological, and socio-economic issues, across a range of appropriate spatial and temporal scales specific to each issue.

This unit will represent the collective research expertise and interests of scientists located in Fresno, Davis and Albany as well as other scientists within the Pacific Southwest Research Station. With a full spectrum of research, from long term, fundamental research to short-term, tactical applications, this Center is intended to support conservation, restoration, and sustainable utilization of the lands within the Sierra Nevada ecoregion.



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Application of Research Results:

We intend to maximize the value of what is learned through primarily what scientists refer to as passive adaptive management; where we examine response to treatments using a case study or survey method. A strict "survey" will not have the ability to address the questions in an experimental manner. However, examination of key forest elements over a large geographic area will provide insights rarely available in scientific studies. We are investigating portions of the Sierra Nevada's westside coniferous forest ecosystem that will be subject to management actions (i.e. fuels treatments and silviculture) and examining a set of alternative predictive models that represent competing hypotheses about how the system will respond. This approach acknowledges that the relationship between the chosen management action and the mechanism that affects the system is not perfectly precise. We know there will be sources of variation within the measured response variables that will be unexplained by the models. But with some ability to assess an array of predictive or explanatory variables control we will learn about ecosystem functioning through evaluation of alternative ecosystem models to determine which ones provide the best fit to the observed responses.

A key feature of adaptive management is that actions be studied at the same scale as management is conducted. Some of the important National forest management activities today are carried out at the landscape scale. Moreover, certain key response variables cannot be addressed without adopting a landscape level of inquiry. Variables such as spotted owl population response (e.g. density of owls) across time and space, or fire behavior response to alternative landscape configurations of fuel treatments, are not possible to investigate without using large land units. To the extent that we can we will continue to try and understand how responses observed are manifested at different spatial scales including these large geographic units of interest.

Location:

The location for this study is on portions of the Plumas and Lassen National Forests, including much of the land base for the HFQLG Pilot Project within the westside coniferous forests. The HFQLG Pilot Project includes approximately 2.5 million acres within the Lassen, Plumas, and Tahoe National Forests.



Photo: Claire Gallagher

www.fs.fed.us/psw/programs/snrc

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